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EXAMINER

MAYO, TARA L

ART UNIT PAPER NUMBER

3671

DATE MAILED: 06/27/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/728,405

Applicant(s)

FOX, NATHANIEL S.

Examiner

Tara L. Mayo

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 12 February 2004.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-59 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-59 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 February 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>11 Jan 05 and 03 May 05</u> | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Information Disclosure Statement***

1. The information disclosure statement filed 03 May 2005 fails to comply with 37 CFR 1.98(a)(3) because it does not include a concise explanation of the relevance, as it is presently understood by the individual designated in 37 CFR 1.56(c) most knowledgeable about the content of the information, of each patent listed that is not in the English language. It has been placed in the application file, but the information referred to therein has not been considered.

### ***Drawings***

2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: 40 and 78. Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

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3. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference characters "52" and "53" and "59" have all been used to designate the opening in the head element of the tube (Figures 14 and 15A). Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

4. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference characters "56" and "68" have both been used to designate the rod (Figure 17). Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

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5. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the sacrificial cap comprising a transaxial plate member and a rod member extending from the plate member into the hollow tube as set forth in claims 28 through 30 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Claim Objections***

6. Claims 6, 19, 22, 40 and 54 through 56 are objected to because of the following informalities: inconsistent claim terminology, lack of antecedent basis.

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In claim 6 on line 2, change "the hopper" to --a hopper--. Repeat the correction for claim 40 on line lines 1 through 2.

In claim 19 on line 2, delete "liquid" and insert therefor --fluid--.

In claim 22 on line 2, delete "element" and insert therefor --device--.

In claims 54 through 56, delete "step" and insert therefor --distance--.

Appropriate correction is required.

### ***Specification***

7. The disclosure is objected to because of the following informalities: incorrect reference numeral. In paragraph 55 on line 2, delete "48" and insert therefor --38--. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

8. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

9. Claims 28 through 30, 49 and 50 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The Specification as originally filed fails to provide support for a sacrificial

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cap comprising a transaxial plate member and a rod member extending from the plate member into the hollow tube; or a bottom head element, and additionally, an axial rod and plate.

10. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

11. Claims 28 through 30, 49, 52 and 53 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

With regard to claim 28, the scope of the claimed invention is indefinite because it is unclear how a sacrificial cap can be attached to a rod member.

With regard to claim 49, it is unclear which of the previously recited structural features Applicant is referencing with the term "axial dimension."

With regard to claim 52, it is unclear which of the recited steps are repeated.

### ***Claim Rejections - 35 USC § 102***

12. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

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13. Claims 2, 32 through 36, 43, 47, 48, 51, 53, 55, 57 and 58 are rejected under 35

U.S.C. 102(b) as being anticipated by Pao Chen (U.S. Patent No. 3,869,869).

Pao Chen '869, as seen in Figures 1 through 8, teach:

with regard to claim 2,

an apparatus for construction of a soil reinforcement pier in a soil matrix comprising, in combination:

an elongate hollow tube (1) having a longitudinal axis, a top material entrance end, an open bottom material discharge end; and

a shaped bottom head element (4) comprising the open discharge end configured to provide axial and transaxial stress components onto the soil matrix surrounding the head element upon lowering the hollow tube into the soil matrix, said bottom head element being attached to the hollow tube and including a mechanism (5) for closing and opening the discharge end of the hollow tube.

With regard to claims 32 through 36, 43, 47, 48, 51, 53, 55, 57 and 58, Pao Chen '869 expressly teaches the structural features and method steps recited therein (col. 3, lines 1 through 18 and 25 through 33).

14. Claims 9, 11, 12, 13, 14 and 59 are rejected under 35 U.S.C. 102(b) as being anticipated by Visconti (U.S. Patent No. 5,152,639).

Visconti '639, as seen in Figures 1 through 2 and 3 through 5, shows an apparatus (10) for construction of a soil reinforcement member in a soil matrix comprising, in combination:



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with regard to claims 9 and 59,

an elongate hollow tube (11) having a longitudinal axis, a top material entrance end, an open bottom head element discharge end (15), the external cross section of the bottom head element discharge end being greater than the external cross section of the hollow tube adjacent thereto to thereby form a bulbous section of the hollow tube having a cross sectional shape and size greater than the cross sectional shape and size of the hollow tube adjacent the bulbous end; and

a mechanism (12 or 13) for selectively closing and opening the discharge end of the hollow tube;

with regard to claim 11,

wherein the mechanism for selectively closing and subsequently opening comprise a sacrificial cap (12) affixed to the shaped bottom head element of the hollow tube;

with regard to claim 12,

wherein the mechanism for selectively closing and opening comprise a valve device; with regard to claim 13,

wherein the mechanism for selectively closing and opening comprise a valve device that opens by gravity and closes by contacting aggregate material in the soil matrix upon downward movement of the hollow tube (col. 3, lines 25 through 33); and

with regard to claim 14,

wherein the head element comprises a frustoconical element formed on the discharge end of the hollow tube.

***Claim Rejections - 35 USC § 103***

15. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

16. Claims 1, 7, 17, 22, 24, 25, 26, 27, 31, 32, 33 and 44 through 46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ogawa (U.S. Patent No. 3,772,892) in view of Lancaster (U.S. Patent No. 1,477,567).

Ogawa '892, as seen in Figure 1, discloses an apparatus for constructing a pier in a soil matrix comprising:

with regard to claim 1,

an elongate hollow tube (1) having a longitudinal axis, a top material entrance end (2), an open bottom material discharge end;

with regard to claims 17 and 45,

further including a hopper feed mechanism (3) connected to the top material entrance end of the hollow tube;

with regard to claim 25,

further including a force mechanism (2) connected to the hollow tube for providing a force on said hollow tube; and

with regard to claim 27,

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a force mechanism (2) for providing an optional force on the hollow tube, the force being a vertically reciprocating force or a vertically vibrating dynamic axial force (col. 3, lines 42 through 49);

with regard to claim 31,

wherein the hollow tube has a generally constant cross sectional profile.

Ogawa '892 fails to teach:

a shaped bottom head element configured to provide axial and transaxial stress components onto the soil matrix surrounding the head element, the head element including a sacrificial cap removable from the tube upon upward movement of the tube within the soil matrix;

the cross sectional area of the tube being varied along the longitudinal length of the tube with the cross sectional area of the bottom head element being greater than the cross sectional area of the remainder of the hollow tube;

the bottom head element being beveled;

the sacrificial cap being generally hexagonal;

a force mechanism connected to the hollow tube for providing a static axial force of typically between five tons and twenty tons.

Lancaster '567, as seen in Figures 1 through 3, shows a device for forming piles in a soil matrix comprising a hollow tube (*a*) and a shaped bottom head element (combination of *b*, *g* and *j*) configured to provide axial and transaxial stress components onto the soil matrix surrounding

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the bottom head element upon lowering the tube into the soil matrix, the bottom head element including a beveled sacrificial cap, wherein the head element is greater in cross sectional area than the remainder of the tube.

With regard to claims 1, 7, 22 and 44, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the device shown by Ogawa '892 with a head element as taught by Lancaster '567. The motivation would have been to prevent entry of soil into the hollow of the tube during driving and to provide a footing for the soil reinforcement element.

With regard to claim 24, it would have been an obvious design choice for one in the art at the time the invention was made to make the sacrificial cap of the device shown by the combination of Ogawa '892 and Lancaster '567 generally hexagonal, since such a modification would have involved a mere change in the shape of a component. It has been held that matters relating to ornamentation only which have no mechanical function cannot be relied upon to patentably distinguish the claimed invention from the prior art. *In re Seid*, 161 F.2d 229, 73 USPQ 431 (CCPA 1947).

With regard to claims 26 and 46, it would have been obvious to one having ordinary skill in the art of earth boring/penetrating at the time the invention was made to further modify the device shown by Ogawa '892 and Lancaster '567 such that it would include a weight between five tons and twenty tons connected to the hollow tube since it is a well known expedient in the art to increase the static load on a member being driven to facilitate its entry into the ground.

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With regard to claims 32 and 33, the method steps recited therein are inherent to the use of the device disclosed by combination of Ogawa '892 and Lancaster '567.

17. Claims 2, 3, 4, 5, 6, 8, 19, 21 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ogawa (U.S. Patent No. 3,772,892) in view of Pao Chen (U.S. Patent No. 3,869,869).

Ogawa '892, as seen in Figure 1, discloses an apparatus for constructing a pier in a soil matrix comprising:

with regard to claim 2,

an elongate hollow tube (1) having a longitudinal axis, a top material entrance end (2), an open bottom material discharge end;

with regard to claim 3,

a solid material feed mechanism (3) for feeding aggregate material into the hollow tube entrance end; and

with regard to claim 4,

wherein the hollow tube has a generally circular internal cross section and further including an aggregate feed mechanism (3) connected to the top material entrance end for feeding items of aggregate material.

Ogawa '892 fails to teach:

a shaped bottom head element comprising the open discharge end configured to provide axial and transaxial stress components onto the soil matrix surrounding the head element upon

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lowering the hollow tube into the soil matrix, the bottom head element being attached to the hollow tube and including a mechanism for closing and opening the discharge end of the hollow tube;

- a fluid feed mechanism;

- the minimum size of the internal diameter of the hollow tube being at least 4.0 times the maximum size dimension of the largest item of aggregate material;

- at least one auxiliary feed tube connected to the hollow tube through openings in the hollow tube end for feeding fluid material into the hollow tube;

- at least one auxiliary feed tube connected to a hopper for feeding liquid material into the hollow tube;

- a valve device for opening and closing the open discharge end for discharge of aggregate therefrom upon opening of the discharge end, the hollow tube and valve device being insertable into a soil matrix and the valve device including a mechanism to open the valve device upon subsequent raising of the hollow tube to discharge aggregate into a cavity region vacated by the hollow tube;

- a mechanism for selectively opening and closing the fluid feed tube; and

- the valve device including a beveled external surface.

Pao Chen '869, as seen in Figures 1 and 2, discloses a device for casting cement-sand grout piles in a soil matrix (13), the device comprising a hollow tube (1) and a shaped bottom head element/valve device (4) comprising the open discharge end configured to provide axial and transaxial stress components onto the soil matrix, wherein the bottom head element/valve

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device is attached to the hollow tube and includes a mechanism (5) having a beveled external surface for closing and opening the discharge end of the hollow tube; the device further including at least one auxiliary feed tube (10) connected to the hollow tube through an opening in the hollow tube end for feeding cementitious grout (col. 3, lines 10 through 13) into the lower end of the hollow tube, wherein the fluid feed tube includes means (11) for selectively opening and closing the fluid feed tube.

With regard to claims 2 and 8, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the device shown by Ogawa '892 such that it would include a head element (valve device) as taught by Pao Chen '869. The motivation would have been to provide means to simultaneously facilitate entry of the device into the soil matrix and the passage of grout.

With regard to claims 3, 5, 6, 19 and 21, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the device disclosed by Ogawa '892 such that it would further include an auxiliary feed tube, as taught by Pao Chen '869, connected to the hopper. The motivation would have been to supply an additional, fluid material to the tube for discharge with the aggregate into the soil matrix.

With regard to claim 4, it would have been obvious to one having ordinary skill in the art at the time the invention was made to make the internal diameter of the hopper of the device shown by Ogawa '892 and Pao Chen '869 no smaller than at least four times the maximum size dimension of the largest item of aggregate material. The motivation would have been to prevent clogging of the hopper during use.

18. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Visconti (U.S. Patent No. 5,152,639) in view of Lancaster (U.S. Patent No. 1,477,567).

Visconti '639 fails to teach:

a shaped bottom head element at the discharge end, the head element configured to provide simultaneous axial and transaxial stress components on soil matrix material surrounding the head element upon axial reciprocation of the hollow tube in the soil matrix.

Lancaster '567, as seen in Figures 1 through 3, shows a device for forming piles in a soil matrix comprising a hollow tube (*a*) and a shaped bottom head element (combination of *b*, *g* and *j*) configured to provide axial and transaxial stress components onto the soil matrix surrounding the bottom head element upon axial reciprocation of the hollow tube in the soil matrix.

With regard to claim 10, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the device shown by Visconti '639 with a head element as taught by Lancaster '567. The motivation would have been to facilitate entry of the tube into the and prevent soil from entering the hollow of the tube during driving.

19. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Visconti (U.S. Patent No. 5,152,639).

Visconti '639 further teaches:

with regard to claim 15,



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the internal cross-section of the hollow tube being generally circular.

Visconti '639 fails to teach:

with regard to claim 15,

the internal diameter of the tube being about four times greater than the maximum dimension of aggregate particles fed into the hollow tube.

With regard to claim 15, it would have been obvious to one having ordinary skill in the art at the time the invention was made to make the internal diameter of the tube of the device shown by Visconti '639 no smaller than at least four times the maximum size dimension of the aggregate particles fed into the hollow tube. The motivation would have been to prevent clogging of the tube during use.

20. Claims 16 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Visconti (U.S. Patent No. 5,152,639) in view of Colle (U.S. Patent No. 3,270,511).

Visconti '639 fails to teach:

with regard to claim 16,

passageway openings in the hollow tube above the bottom head element for fluid materials within the hollow tube to flow out of the hollow tube above the bottom head element and outside of the hollow tube into an annulus formed between the hollow tube and the soil matrix; and

with regard to claim 20,

a mechanism for selectively opening and closing the passageway openings.

Colle '511, as seen in Figures 4 and 5, discloses a method for forming structural members (90) in the ground comprising the step of discharging fluid materials from a hollow tube (80) into an annulus through openings (84) positioned above a head element (82).

With regard to claim 16, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the device disclosed by Visconti '639 such that it would include openings as taught by Colle '511. The motivation would have been to discharge material radially from the tube.

With regard to claim 20, the combination of Visconti '639 and Colle '511 fail to teach a mechanism for selectively opening and closing the passageway openings. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the device with the addition of a mechanism for selectively opening and closing the openings. The motivation would have been to enable selective radial discharge as desired.

21. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Visconti (U.S. Patent No. 5,152,639) in view of Kato et al. (U.S. Patent No. 6,540,443 B2).

Visconti '639 fails to teach:

with regard to claim 18,

at least one isolation damper connecting the hopper to the hollow tube.

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Kato et al. '443, as seen in Figure 2, show a ground-boring system (1) including a damper (123) for absorbing shocks during operation and preventing damage to the system (col. 6, lines 1 through 6).

With regard to claim 18, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the device shown by Visconti '639 such that it would include a damper, as taught by Kato et al. '443, between the hopper and the hollow tube for absorbing shocks and preventing damage to the hopper.

22. Claims 37 through 42, 52, 54 and 56 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pao Chen (U.S. Patent No. 3,869,869).

Pao Chen '869 fails to teach:

the additional step of separately feeding a liquid material in combination with the aggregate to facilitate aggregate flow;

the liquid material being selected from the group consisting of water, cementitious grout, bentonite, cement, fly ash and combinations thereof;

the liquid material being fed into the hollow tube;

the liquid material being fed into the hopper;

the liquid material being fed from the hollow tube;

the liquid material being fed into the cavity from a feed mechanism that feeds the liquid in an annular pattern above the bottom head element, near the bottom end of the hollow tube;

the first incremental distance being varied for at least one of the repetitions;

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the first incremental distance being substantially equal to the height of the pier to be formed; and

the first incremental distance being greater than two feet and less than the height of the pier to be formed.

With regard to claims 37 through 39 and 42, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method disclosed by Pao Chen '869 such that it would include using an additional feed tube (10) for separately feeding cementitious grout (16) in combination with the aggregate material into the hollow tube and from the hollow tube into the soil matrix, since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art. *St. Regis Paper Co. V. Bemis Co.*, 193 USPQ 8.

With regard to claim 40, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method disclosed by Pao Chen '869 such that it would include the step of feeding the liquid material into a hopper since it is a well known expedient to use hoppers for supplying materials.

With regard to claims 52, 54 and 56, it would have been obvious to one having ordinary skill in the art through routine experimentation and optimization to determine an optimal height for the pier to be formed by the method disclosed by Pao Chen '869 since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimal or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

***Conclusion***

23. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tara L. Mayo whose telephone number is 571-272-6992. The examiner can normally be reached on Monday through Friday 8:30 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas B. Will can be reached on 571-272-6998. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

tlm  
23 June 2005

  
ROBERT E. PEZZUTO  
PRIMARY EXAMINER